DOCUMENT RESUME

ED 326 692 CE 056 520

AUTHOR Pritz, Sandra G.
TITLE The Role of Vocational Education in the Development of Students' Academic Skills: An Implementation Guide. Information Series No. 340.
INSTITUTION ERIC Clearinghouse on Adult, Career, and Vocational Education, Columbus, Ohio.
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE 89
CONTRACT RI88062005
NOTE 51p.; Includes "Vocational Technical Education: Developing Academic Skills. A Position Statement of the National Association of State Directors of Vocational Technical Education Consortium."
AVAILABLE FROM Center on Education and Training for Employment, 1900 Kenny Road, Columbus, OH 43210-1090 (implementation guide order no. IN340--$5.25); National Association of State Directors of Vocational Technical Education, 1420 16th Street, N.W., Washington, DC 20036 (position statement--$5.00).
PUB TYPE Guides - Non-Classroom Use (055) -- Information Analyses - ERIC Information Analysis Products (071) --

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Academic Education; *Basic Skills; Curriculum Development; Educational Change; *Educational Cooperation; *Integrated Curriculum; Job Skills; School Restructuring; Secondary Education; Team Teaching; *Vocational Education

ABSTRACT

Integrated programs provide students with a balanced mix of academic and vocational skills needed in the workplace and for lifelong learning. Basic skills in mathematics, science, and communication form the foundation for lifelong learning and the content for higher-order skills. Occupational skills depend on and do not exist apart from academic foundations. The National Association of State Directors of Vocational Technical Education Consortium supports the concept of integration and the restructuring of the relationship between academic and vocational education. Federal, state, and local initiatives are recommended to bring about this reform. A number of strategies for implementing the vocational-academic approach are being tried in many schools, bolstered by the mandate for enhanced integration in the Carl D. Perkins Vocational and Applied Technology Education Act. More widespread implementation depends on the resolution of a number of issues: (1) developing the drive and achieving commitment from all levels; (2) setting goals to bring about the integration of academics in vocational education and the integration of academic and vocational education; (3) overcoming such barriers as staff concerns and lack of funding; (4) determining structural questions such as who will teach academic and vocational skills, what effect will organizational structure have on making changes, what curricular materials will be used, and who else (parents, counselors, community) needs to be involved; (5) providing inservice training for vocational and academic teachers; and (6) preparing to evaluate integration efforts. One strategy for implementation is cross-correlation of vocational and academic curricula, that is, identification of exactly where academic concepts are used in vocational courses. A matrix of vocational tasks and academic concepts can assist in this effort. Cross-correlation can lead to other joint activities such as adaptation/adoption of curriculum materials, shared lesson planning, and documentation for granting academic credit for basic skills taught in vocational classes. Recognition is growing that integrated partnerships supporting students' varied learning styles are the most effective means of achieving the academic and vocational competence needed in a global economy. The policy issues, strategies, and examples provided in this position statement and guide can assist policy makers, administrators, and teachers in reaching that goal. (SK)

1989

ERIC

Clearinghouse on Adult, Career, & Vocational Education

The Role of Vocational Education in the Development of Students' Academic Skills

by

Sandra G. Pritz

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

C Hansen
M Hemmings

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Information Series No. 340

CENTER ON EDUCATION AND TRAINING FOR EMPLOYMENT
THE OHIO STATE UNIVERSITY

BEST COPY AVAILABLE

THE CENTER MISSION STATEMENT

The mission of the Center on Education and Training for Employment is to facilitate the career and occupational preparation and advancement of youth and adults.

The Center fulfills its mission by utilizing the full range of resources at The Ohio State University; conducting applied research, evaluation, and policy analyses; and providing leadership development, technical assistance, and information services that pertain to—

- the delivery of education and training for work;
- the quality and outcomes of education and training for employment;
- the quality and nature of partnerships with education, business, industry, and labor;
- opportunities for persons in at-risk situations to succeed in education, training, and work environments;
- short- and long-range planning for education and training agencies; and
- approaches to enhancing economic development and job creation.

Information Series No. 340

THE ROLE OF VOCATIONAL EDUCATION IN THE DEVELOPMENT OF STUDENTS' ACADEMIC SKILLS

IMPLEMENTATION GUIDE

Sandra G. Pritz
Center on Education and Training for Employment

ERIC Clearinghouse on Adult, Career, and Vocational Education
Center on Education and Training for Employment
The Ohio State University
1900 Kenny Road
Columbus, OH 43210-1090

1989

FUNDING INFORMATION

Project Title:	ERIC Clearinghouse on Adult, Career, and Vocational Education
Contract Number:	RI88062005
Act under Which Administered:	41 USC 252 (15) and P.L. 92-318
Source of Contract:	Office of Educational Research and Improvement U.S. Department of Education Washington, DC 20208
Contractor:	Center on Education and Training for Employment The Ohio State University Columbus, Ohio 43210-1090
Executive Director:	Ray D. Ryan
Disclaimer:	This publication was prepared pursuant to a contract with the Office of Educational Research and Improvement, U.S. Department of Education. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
Discrimination Prohibited:	Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance." Title IX of the Education Amendments of 1971 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving federal financial assistance." The ERIC Clearinghouse project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.

TABLE OF CONTENTS

FOREWORD v

EXECUTIVE SUMMARY vii

INTRODUCTION 1

IMPLEMENTATION ISSUES TO CONSIDER 3

- Developing the Drive 3
- Setting Goals 3
- Overcoming Barriers 5
- Structural Issues 6
- Preparation 9
- Evaluation 9

ALTERNATIVE IMPLEMENTATION STRATEGIES 11

ABSTRACTS OF EXEMPLARY PROGRAMS 13

CURRICULAR RESOURCES 25

REFERENCES 27

FOREWORD

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is 1 of 16 clearinghouses in a national information system that is funded by the Office of Educational Research and Improvement (OERI), U.S. Department of Education. This publication was developed to fulfill one of the functions of the clearinghouse--interpreting the literature in the ERIC database.

The Role of Vocational Education in the Development of Students' Academic Skills represents a collaborative effort between ERIC/ACVE and the National Association of State Directors of Vocational Technical Education Consortium (NASDVTEC). The need to develop methods of integrating academic and vocational skills has remained a high priority for the field of vocational-technical education. This package is intended to assist in that process. One component is a statement, ***Vocational Technical Education: Developing Academic Skills***, that presents NASDVTEC's position on the role of vocational-technical education in helping students develop basic academic skills. The second part is an implementation guide designed to assist administrators and practitioners in educational settings in implementing integrated programs that will help students acquire the academic skills needed in the workplace and as a foundation for lifelong learning.

In 1986, the Center on Education and Training for Employment (CETE) at the Ohio State University undertook the research, synthesis, and development of a package of resource materials (***BASICS: Bridging Vocational and Academic Skills***) to assist educators in the integration effort by sharing what had been learned. The author of this implementation guide, also a developer of the BASICS package, has adapted portions of the guide directly from documents in the package and incorporated findings from subsequent experience.

ERIC/ACVE would like to thank Sandra G. Pritz, Senior Program Associate at CETE, for her work in the preparation of this publication. Her college teaching experience and 17-year specialization in curriculum development and instruction for both education and industry have been applied in the development of materials to assist students who have low basic skills achievement and in numerous articles, presentations, and workshops on the subject. Ms. Pritz was one of the primary developers of the BASICS package and also directed a project that resulted in a package of teacher and student materials entitled ***The Dropout Prevention Series***. She has worked on the basic competencies project and the dropout prevention initiative of the Southern Regional Education Board's State Vocational Education Consortium and has worked with NASDVTEC on basic skills integration.

The following people are also acknowledged for their critical review of the manuscript prior to publication: Karen Ryals, Director, Adult and Vocational Education, Alaska Department

of Education; Richard C. Makin, Coordinator of Research, Oklahoma Department of Vocational-Technical Education; and Mark Newton, Associate Director, CETE.

Publication development was coordinated by Susan Imel. Sandra Kerka edited the manuscript, and Janet Ray served as word processor operator.

Ray D. Ryan
Executive Director
Center on Education and
Training for Employment

EXECUTIVE SUMMARY

Integrated programs give students a balanced mix of academic and vocational skills needed in the workplace and for lifelong learning. Basic skills in mathematics, science, and communication form the foundation for lifelong learning and the content for higher-order skills. Occupational skills depend on and do not exist apart from academic foundations.

The National Association of State Directors of Vocational Technical Education Consortium supports the concept of integration and the restructuring of the relationship between academic and vocational education. Federal, state, and local initiatives are recommended to bring about this reform.

A number of strategies for implementing the vocational-academic approach are being tried in many schools, bolstered by the mandate for enhanced integration in the Carl D. Perkins Vocational and Applied Technology Education Act. More widespread implementation depends on the resolution of a number of issues:

- Developing the drive and achieving commitment from all levels
- Setting goals to bring about the integration of academics in vocational education and the integration of academic and vocational education
- Overcoming such barriers as staff concerns and lack of funding
- Determining structural questions such as--
  - -- who will teach academic and vocational skills
  - -- what effect will organizational structure have on making changes
  - -- what curriculum materials will be used
  - -- who else (parents, counselors, community) needs to be involved
- Providing inservice training for vocational and academic teachers
- Preparing to evaluate integration efforts

One strategy for implementation is cross-correlation of vocational and academic curricula, that is, identification of exactly where academic concepts are used in vocational courses. A matrix of vocational tasks and academic concepts can assist in this effort. Cross-correlation can lead to other joint activities such as adaptation/adoption of curriculum materials, shared lesson planning, and documentation for granting academic credit for basic skills taught in vocational classes.

Exemplary integrated programs can be found at the school district level (Norfolk Public Schools, Virginia and New Bern-Craven County Schools, North Carolina), at the state level (Ohio's Program OPTIONS, Arizona's Basic/Essential Skills Taxonomy), and at the regional level (the Southern Regional Education Board's State Vocational Education Consortium).

The Center for Occupational Research and Development and the Agency for Instructional Technology have developed the following integrated curricula based on the concepts of applied learning: Principles of Technology, Applied Communication, Applied Mathematics, Applied Biology/Chemistry, and Workplace Readiness.

Recognition is growing that integrated partnerships supporting students' varied learning styles are the most effective means of achieving the academic and vocational competence needed in a global economy. The policy issues, strategies, and examples provided in this position statement and guide can assist policy makers, administrators, and teachers in reaching that goal.

Information on integrating academic and vocational education may be found in the ERIC database using the following descriptors: *Academic Education, *Basic Skills, Curriculum Development, Educational Change, *Educational Cooperation, *Integrated Curriculum, Job Skills, School Restructuring, Secondary Education, Team Teaching, *Vocational Education. Asterisks denote descriptors having particular relevance.

INTRODUCTION

The purpose of this implementation guide is to assist educational administrators and practitioners in implementing integrated programs that will help students acquire the academic skills needed in the workplace and as a foundation for lifelong learning. In this paper, "integration" is used to describe the various ways in which educators are changing practices and curricula to provide students a balanced mix of academic and vocational experience based on the concept of applied learning. A number of strategies for implementing the vocational-academic approach are being tried at different levels in many schools throughout the nation, and these efforts will be bolstered by the targeted mandate calling for enhanced integration in the Carl D. Perkins Vocational and Applied Technology Education Act.

The publication of the position statement by the National Association of State Directors of Vocational Technical Education Consortium represents an important step in the promulgation of the vocational-academic integration concept with one unified voice. Furthermore, this statement should be helpful in communicating with policy makers at the national, state, and local levels and in communicating with nonvocational educators who are a critical half of the integration equation.

In 1986, the Center on Education and Training for Employment at the Ohio State University undertook the research, synthesis, and development of a package of resource materials (***BASICS: Bridging Vocational and Academic Skills***) to assist educators in the integration effort by sharing what had been learned. It was clear then, as it is now, that the exact process by which educators of widely differing backgrounds, training, and experience can work effectively together varies according to the situation. However, it is also clear that the educational challenges of today can best be met through concerted action by all educators to design programs that apply the academic skills in the context of occupational preparation.

The "how to" involves (1) resolving a number of issues, at least in a preliminary way; (2) designing integration efforts; and (3) sharing information and resources. This guide discusses these steps and then presents some examples of existing exemplary programs.

IMPLEMENTATION ISSUES TO CONSIDER

Developing the Drive

A thoughtful analysis of the reasons for deciding to embark on an integration program will result in a clarity of purpose that is important for developing commitment and for shaping the implementation. The impetus may have come from the national, state, or district level, but educators at the building level need to believe that the change can result in improved student achievement and teacher performance. Factors should be identified that people consider "burning issues" and care about enough to invest themselves and to base action on them.

Several factors that have proven to be rallying points for others are as follows:

- The need to help students meet expanded graduation requirements
- Decreased vocational enrollments and decline in program offerings
- A high rate of illiteracy and/or unemployment in the geographical area
- The role that vocational-academic integration can play in dropout prevention and in meeting the needs of students with low motivation for learning
- Response to business and industry's recognition that employees need stronger basic skills for adequate job performance
- External pressure for accountability. (Many schools are feeling the pressure from the state level, where response to the concerns has been articulated, to the extent that some form of integration or related outcome has been mandated in a number of states.)

Developing the drive depends on an advocate--a person or a support group who understands the situation, believes in the initiative, and can obtain the support of others, from the school board and superintendent to school personnel. Leadership from school and central office administration is important at this stage and continues to be important at later stages.

Setting Goals

A prerequisite for setting goals is to establish a common understanding of the related terminology. For example, the term "basic academic skills" carries different meanings to different people. In this discussion, basic academic skills is used to mean foundational rather than low level, elemental rather than elementary. Basic academic skills, generally drawn from mathematics, communications (reading, writing, speaking, and listening), and science, provide foundations for further learning. They provide a depth of understanding that allows for generalizability and transfer across tasks. Higher-order skills such as problem solving, critical thinking, and decision making represent a

purposeful combination of basic skills for application (Pratzner 1988).

It should be noted in this context that, clearly, the role of vocational education in academic skills acquisition is not limited to basic skills remediation. Although vocational programs may provide a setting within which ability to use learned basic math, communications, and science can be effectively assessed, serious academic deficits that have accumulated for many years are not suitably addressed **solely** through vocational instruction. However, some evidence exists that remediation and academic instruction in general can take place more effectively through a strategy of high expectations and applications rather than rote drill of isolated low-level facts (Bottoms 1989; Peterson 1989); certainly, vocational programs can employ this strategy.

Setting goals also requires a decision about the desired scope and intensity of the program. The concept of integrated education goes to the heart of school organization, desired learner outcomes--indeed, the basic questions of teaching and learning. Goals must be set that account for the breadth of the concept and yet are realistic. The goals must reflect the realities of local process, yet focus on student and school performance.

As one might expect, the ways integration is put into practice fall along a continuum. One end of that continuum might be labeled integration of academics **in** vocational education and the other end is integration of academic **and** vocational education.

Integration of Academics in Vocational Education

One type of response to the challenge is simply for vocational educators to take on more responsibility for academic basic skills as part of their programs. This is essentially a unilateral approach, perceived generally as reinforcement, application, and enhancement of skills that students should possess already. Vocational instructors vary in their degree of comfort and adequacy of training to undertake intensified efforts in this regard. As visibility and awareness of the need spread, more vocational instructors are receiving inservice training and seeking further education in teaching academics. It is recognized that more is needed. Research indicates that, on the average, vocational teachers report completing just over one college course in communications and mathematics and about two courses plus 3-4 hours of inservice training in teaching basic skills in their subject areas. On the average, both vocational and nonvocational teachers report that they have completed less than one college course and very little, if any, inservice training related to working with the gifted/talented, the disadvantaged, limited-English-proficient students, the handicapped, or single/teenage parents (Weber et al. 1988).

A helpful adjunct is the growing, though still inadequate, availability of learning materials that focus on basic skills in particular vocational programs. These materials, some of which promote integrative higher-order thinking, are important tools to assist teachers who are ready to make changes in their practices.

Integration of Academic and Vocational Education

The type of response to the challenge that moves beyond the unilateral to a joint effort of vocational and academic educators is a pioneering endeavor to bridge the unhealthy schism that often exists between academic and vocational programs and their staffs. It involves recognition that each has much to offer the other and that the challenge can best be met through concerted action with a three-part agenda:

- to strengthen the academic basis of vocational education,
- to strengthen the connection between concept learning and application in academic education, and
- to strengthen the application of academic skills in the workplace.

Overcoming Barriers

Change is a process, not an event. Often, people recognize in theory that any new process will have its difficult aspects to be worked out over time. In practice, it seems to help to know what the typical barriers are. Those listed here are local or district concerns.

Staff Concerns

It is natural for both vocational and academic teachers to have concerns about change. Some of these concerns need to be shared with administrators to find out their thinking and to make them aware of the feelings. It also helps for teachers to share their concerns--to seek answers, to seek help, and to develop a spirit of sharing and trust.

Some typical concerns of both academic and vocational teachers are the following:

- How will this change affect my job--especially my job security?
- Will I be relinquishing control over what I teach?
- How will I find time to cover the vocational content if more time is spent on academics? (or) How will I find time to cover the academic content if more time is spent on applications?
- How much additional work will be involved in the change, and how will I find the time and energy to do it?
- Can I count on the needed administrative support for this change?

Vocational teachers may wonder how strong their own academic skills need to be in order to teach others. They wonder how they can develop the needed skills. They also suspect that academic teachers will be reluctant to get involved.

Academic teachers may be concerned about their ability to relate their subject matter to occupational reality. Some may be concerned about the wisdom of doing so; they may worry about keeping their subject matter "pure," not watered down. Academic teachers also share many of the same concerns as vocational teachers.

The experiences of many other teachers in pioneering joint efforts have indicated that such concerns are normal. They can be alleviated and ultimately dispelled by creative inservice opportunities to work

together and broad administrative support for doing so. The real need and the positive results for both students and teachers soon become paramount in their thinking.

Funding

Although change rarely comes without a price tag, vocational-academic integration is relatively inexpensive because it is primarily a change in approach. However, there is no escaping the fact that resources to buy staff time for planning, inservice training, and curriculum revision are important to successful efforts.

Federal and state support for the integration effort is increasing. In applying for support, it is helpful to remember all the related programs whose goals can be reached through the applied academics avenue. A number of districts have pooled funding from programs for dropout prevention, education of the disadvantaged, and the Job Training Partnership Act (JTPA). The new initiatives for "tech prep" can viably be coordinated with vocational-academic integration.

The window of opportunity is open wide to involve business and industry. Companies that are nervously viewing the potential for adequate preparation of their future work force can assist in the integration effort in numerous ways.

Structural Issues

Instruction

Who will teach the academic skills? In some institutions and in some states, vocational educators are identifying the academic skills they already teach in their programs and are seeking--and being granted--approval to award academic credit toward graduation for academic skills learned through vocational instruction. A great deal of math or science or English is already taught in vocational classes because the academic skills are essential to successful performance of the occupational skills. Many an electronics teacher provides science instruction. Many a business teacher provides English instruction. Many a carpentry teacher provides math instruction.

Other institutions and states feel that to ensure high-quality academics worthy of credit, certified academic teachers must provide the academic instruction, correlated with and reinforced by the occupational instruction. Although vocational teachers possess the academic skills needed for occupational tasks, they may not have the expertise to explain the theory underlying the skill. That is one of the concerns of those urging educational reform.

Who will teach the vocational skills? In some cases, one vocational teacher teaches both shop and related instruction. In other cases, different teachers handle the two instructional tasks or use a team approach to teach both. Taking into consideration the present staffing structure and the demands of the proposed integration effort, those involved in planning need to determine how responsibility for teaching the vocational curriculum will be handled in the future.

Institutional Characteristics

What effect will the organizational structure have on the ability to integrate subjects? Can the structure be modified or changed? The educational institution may house both academic and vocational stu-

dents and teachers, all under unified leadership. Since the teachers are all under the same roof, getting them together is not a physical problem, though it may require scheduling changes.

The institution may house only vocational students, but may have both academic and vocational teachers to provide a total program for those students. As in the previous situation, the actors involved in the change are at least all under the same roof.

On the other hand, the institution may house only occupational students and teachers, with academic students and teachers housed at home schools. The vocational students may complete their academic work prior to or concurrent with their vocational course work. Change to a more integrated system is no less possible in this situation but does involve some additional concerns. For example, when teachers are housed in separate facilities, many different, geographically distant locations may be involved, depending on the number of home schools and the size of the district. That makes interaction among teachers more of a challenge. Strong cooperative relationships may be impeded by the institutions' competition for students in the face of declining enrollments.

Planners need to consider the structure and the level of integration sought in making decisions about whether the structure should remain the same or change to facilitate greater integration. There are numerous options:

- Team vocational and academic teachers to promote sharing
- Cluster the teachers in each vocational program with a math, science, and English teacher
- Give academic teachers a vocational supervisor and vocational teachers an academic supervisor to promote a cross-pollination of ideas and approaches
- Form a vocational-academic team to supervise teachers from both groups

Materials

What curricular materials will be required, and how will they be secured or developed? Poor and even mediocre materials can be the basis for a good deal of discontent. Many teachers have felt the lack of resources for the teaching of applied academics (textbooks, guides, software) to be a major barrier.

The lack of resources is particularly critical given that, in many cases, students in a class represent a wide range of ability levels. Thus, it is recommended that the classes be individualized as much as possible. If the total vocational program is competency based and individualized, adopting the same approach for the academic subjects should not constitute a major problem. If conventional group-based instruction is the institutional norm, however, individualization--particularly without adequate, appropriate curricular materials--can seem an awesome task.

Some integrated materials are available and others are in development. The Center for Occupational Research and Development (CORD) and the Agency for Instructional Technology (AIT) have developed applied science courses for secondary and postsecondary vocational-

technical students, entitled ***Principles of Technology*** and ***Unified Technical Concepts***. CORD has developed materials for applied math, and AIT has developed materials for technical communications. (See **Curricular Resources** section for additional detail.)

In some cases, state- or locally developed materials can be located through such sources as the National Network for Curriculum Coordination in Vocational and Technical Education (NNCCVTE). Often, however, teachers are happier using such materials if they develop--or at least adapt--them. This suggests the need to plan for curriculum development, an activity that takes both time and special skills. These issues are covered in detail in ***BASICS' Instructional Materials Development*** (Pritz and Crowe 1987) and ***Supplementary Instructional Resources*** (Veach, Pritz, and Crowe 1987).

Other Actors

Who else needs to be involved in the effort? The integrated educational program will gain strength if all the significant actors in the student's education are involved in the joint effort. For example, special educators need to be an integral part of the program. They have expertise in strategies to meet individual learner needs in support of basic skills achievement. Parents who are helped to understand the benefits for students of a fully integrated curriculum can lend support. Further, parents usually play another role in which they can be supportive, namely as workers and employers. Those in the workplace can assist the effort by reflecting to the schools the ways in which basic skills are needed for participatory management, quality control, and teamwork.

Guidance counselors have a important role in the integration effort. They are key communicators of the plan and its rationale to students and parents, as well as facilitators of communication between vocational and academic teachers. Another critical aspect of their role is systematic individualized planning with students. Full benefit of an integrated education can be realized only if students are guided toward a coherent program of study with high expectations for achievement, which implies a carefully developed and monitored 4-year plan for each student. Similarly, assessment of student performance is a guidance concern that is of heightened prominence recently.

Once the questions presented here are answered, logistical arrangements can be made to support the effort. Although vocational and academic teachers can provide input on support concerns such as space and time, administrators will usually need to coordinate arrangements. Many support issues relate to time concerns: time to plan, time to meet, time to share. This one concern can make or break the integration effort. If teachers cannot reasonably find the time to get together, they are unlikely to do so. Without this interaction, there can be little cooperation, correlation, or integration. Little team spirit will be built. If, however, at a bare minimum, teachers meet for 10 minutes a day, that sharing is likely to become a habit.

One very effective way to provide time is to phase in the change over an extended period. This not only provides more options for building in the time needed for planning, developing, and implementing the innovation; it also provides time for all the participants to go through the change process to the point where the innovation is routinized, refined, and

institutionalized--an integral part of the curriculum.

Preparation

Another crucial issue is adequate training. Inservice training needs to be available so teachers can feel adequately oriented to the integration approach to be used. They may also want training to perform the occupational and task analyses required, to use the task analyses to identify academic skill requirements, and to develop curricular materials. Training vocational and academic teachers together helps to reinforce a cooperative relationship by providing an environment conducive to sharing.

Virtually everyone in a position to observe sees a great need for inservice (and preservice) training to help teachers understand and practice **applied learning** techniques--not simply developing a commitment to the idea, but following through on how to do it in the classroom. Another topic of needed inservice activity is coordinated teaming. Vocational and nonvocational teachers who are unused to working together can be greatly assisted by some ideas on **how** to coordinate their teaching, whether it be through aligning schedules, actual team teaching, or the dozens of other ways to interact creatively.

Another item for inservice emphasis is the importance of high expectations and attention to differences in student learning styles. Teachers need help in implementing that idea in the classroom. It does not do simply to say "expect more" and leave it at that. Nor is it easy to keep up with what cognitive scientists are discovering about the learning process that can be of immense help.

Vocational and academic teachers may also need additional preparation in each other's fields. Academic teachers can offer workshops to help vocational teachers improve their own basic skills. Vocational teachers can offer minicourses covering occupational skills to help academic teachers relate their instruction to occupational reality. Academic teachers can be invited to vocational teacher conferences to promote sharing of ideas and materials.

Additional preparation can take place through informal sharing. For example, vocational and academic teachers may seek each other's help in private or borrow each other's texts for study.

Evaluation

Once an integration approach has been selected, plans should be made to evaluate the success of the program in producing the expected outcomes. Evaluation is important for local program improvement and decision making. Beyond that, a need exists to gain evaluative evidence about the success of various types of integration efforts. Studies are underway to assess the effectiveness of pilot programs. As results and findings become available and are supplemented by additional studies, they will provide significant information on which practitioners can base decisions.

ALTERNATIVE IMPLEMENTATION STRATEGIES

One of the simplest strategies, at least on the surface, is simply to highlight and make more explicit for students the specific academic basic skills that are embedded in the tasks in their vocational program. The tacit assumption of the past that students can automatically recognize the connections inherent in their different fragmented courses is giving way to the realization that teachers need to help students make connections. Research shows that a significant gap exists between the use of basic skills in the vocational classroom and overt attempts to capitalize on those opportunities to strengthen students' basic skills (Weber et al. 1988). The fact that it is almost impossible to perform a vocational task without using an academic basic skill means that there is a rich mine of "teachable moments" to tap.

A strategy that involves more thorough bilateral cooperation is **cross-correlation of vocational and academic curricula**--in other words, identification by both vocational and academic teachers of exactly where academic concepts are used in vocational courses. A typical vehicle for such identification is a matrix of vocational tasks and academic concepts, which can be coded at intersection points where a particular academic concept is needed to perform a particular vocational task. Various further judgments can be incorporated into the cells of the matrix, such as time spent in instruction and practice or level of learning required. Cross-correlations have been undertaken in a number of districts and fostered by a number of states (as well as by the Center on Education and Training for Employment through its ***BASICS*** resource package).

It is immensely helpful for this cross-correlation of curricula to be accomplished by teachers in tandem. In most instances, for example, math teachers have the training to document the basic math concepts whereas vocational teachers are generally more experienced in how they are used. Furthermore, the cross-correlation activity can be the precursor of a variety of follow-up joint activities once a cooperative working relationship has been established. One of these additional activities is curriculum development or adaptation/adoption of existing learning materials to use as the basis for more integrated instruction. Another is shared planning of who should teach what, when, and to whom to complement each other's efforts most effectively. A third is to provide documentation for the potential granting of academic credit for basic skills achieved in vocational course work, insofar as it can be proven to be fairly earned.

On this last point, much controversy can be averted and discord avoided if the most scientific and professional methods available can be employed to document the skills on which applications for credit are based. During the initial period in which states were mandating increased academic requirements for graduation, fears were expressed that these would fall inequitably on vocational concentrators

who were learning basic skills in vocational classes but accumulating no academic credit for them. Similarly, fears were expressed by academic educators concerning the need to hold firmly to quality standards, lest the academic content required for credit be diluted or taught by those uncertified in the discipline. Although these specters have not disappeared, some progress has been made where there is clear recognition that students need bona fide skills and that it is up to both vocational and academic educators to work together to see that students acquire these skills and get credit for them. It is also important that students earn them in an environment that provides for some diversity in student learning needs.

Overall, students are achieving more where they are counseled to pursue a coherent and rigorous planned program of vocational and academic courses. Some evidence exists that student achievement parallels enrollment in higher-level courses (Bottoms 1989). Implementation strategies should incorporate a multifaceted role for counselors in strengthening basic skills through planning, assessment, facilitation of a team approach, and monitoring.

Strategies selected for implementation should, for each school, fit into and further the other objectives and programs already in place. Educators must be assisted in responding with targeted solutions for needs identified in their own situation. Yet the overall goals and purpose need to be established and unwavering. The following section provides some examples of programs; descriptions of these programs quickly illustrate the points made here concerning flexibility, variability, and single-minded commitment.

ABSTRACTS OF EXEMPLARY PROGRAMS

This section provides summaries of some techniques, models, and practices that have been judged successful at local, state, and regional levels. It shows the diverse efforts being made by educators to promote basic skills learning. The types of strategies range from techniques used independently by classroom teachers to joint efforts made by academic and vocational teachers to develop strategies and materials that reinforce, remediate, and enhance basic skills learning. Each program is composed of a selected blend of elements unique to the foundation on which the program is being built and unique to how the staff perceives the possibilities. The variety of innovative approaches being used nationwide is impressive and gives testimony to the resourcefulness and creativity of the educators involved.

Descriptions of additional exemplary programs with the goal of vocational-academic integration can be found in the following resources:

- Crowe, Michael R.; Pritz, Sandra G.; Sechler, Judith A., and Veach, June. ***BASICS: Bridging Vocational and Academic Skills.*** Columbus: The National Center for Research in Vocational Education, 1987. Relevant items in this series include:

  -- Crowe, Michael R., and Pritz, Sandra G. ***Introducing BASICS***, a videotape.

  -- Crowe, Michael R.; Pritz, Sandra G.; and Veach, June. ***Implementation Guide for BASICS: Bridging Vocational and Academic Skills.***

  -- Adapted by Pritz, Sandra G., and Crowe, Michael R. ***Techniques for Joint Effort: The Vocational-Academic Approach.***

  -- Adapted by Pritz, Sandra G., and Crowe, Michael R. ***Technique for Remediation: Peer Tutoring.***

- Adelman, Nancy E. ***The Case for Integrating Academic and Vocational Education.*** Background paper for the National Assessment of Vocational Education, U.S. Department of Education, 1989.

- Grubb, W. Norton; Plihal, Jane; Davis, Gary; Lum, Jeannie; and Morgaine, Carol. ***"The Cunning Hand, The Cultured Mind": Models for Integrating Vocational and Academic Education.*** Berkeley: National Center for Research in Vocational Education, University of California, forthcoming.

School District Level Programs

Program Site: Norview High School, Norfolk Public Schools, Norfolk, VA

Key Features: Teams of English, math, and vocational teachers; applied learning activities; graduate course offered for teachers; reading across the curriculum.

Description: In 1987 the Norfolk Public Schools were selected as a pilot district for the program ***BASICS: Bridging Vocational and Academic Skills*** developed by the Center on Education and Training for Employment (CETE, then the National Center for Research in Vocational Education) at the Ohio State University. As a result of inservice sessions based on the program materials at the selected high school site, teachers chose to collaborate across academic-vocational lines to develop a series of learning activities that could be used in several courses to help students apply academic basic skills (primarily reading at first) in realistic occupational tasks. The collaborative effort was directed by the pilot site coordinator, the supervisor of business education, who had full administrative support from the superintendent, the school principal, and the director of adult and vocational education for the effort. This effort established a foundation of interdisciplinary communication. Subsequently, the school was also selected as a pilot site for the Strengthening Basic Skills project by the Southern Regional Education Board (SREB)-State Vocational Education Consortium.

Objectives. An advisory committee, composed of central office personnel, school administrators, vocational teachers, math teachers, English teachers, counselors, and community representatives, was organized to establish objectives for the project. Because the high school was already working to improve the reading skills of all students, the advisory committee felt strongly that for the first year, the focus of the project should be on reading. Thus, the objectives included--

- offering a graduate course from Old Dominion University--Teaching Reading across Disciplines--to all vocational, English, and math teachers;
- developing teams of English, math, and vocational teachers to identify and use strategies to strengthen basic competencies;
- reinforcing basic competencies in vocational instruction;
- increasing the time devoted to applied learning activities in English and math classes; and
- encouraging students to take higher-level English and math courses.

Graduate course. Teaching Reading across Disciplines (3 graduate credits) was offered free to all English, math, and vocational teachers at Norview High School in the spring of 1989. The class, which was taught at the high school, provided for the following:

- It enabled teachers to learn about reading strategies to incorporate into their instruction--strategies that lead to active reading by

students, not just recall of information.

- It used the team approach. Five teams were established, each of which was composed of English, math, and vocational teachers.
- It provided time for team members jointly to develop activities based on the identified reading strategies.
- It led to a wide variety of cooperative efforts, innovative ideas, and renewed energy.

A committee of teachers who completed the course selected lesson plans submitted by teachers as a part of the course requirements and compiled them into a booklet to be given to every high school teacher. Follow-up observations were conducted in the classes of those teachers who completed the course.

Project expansion. The project was expanded during the 1989-1990 school year to include science teachers and teachers at the Norfolk Technical Vocational Center who became members of the teams.

In addition, the other SREB pilot site programs in Virginia have been required by the State Department of Education to include an emphasis on reading for learning in their plans. As a minimum, each site set up a team of three persons to develop a plan to improve reading for learning. The Department of Education contracted with a teacher educator to provide inservice training for a team of academic and vocational teachers in strategies for improving reading for learning in content fields. This team became responsible for preparing other teachers at the site.

Contact Person:

Esther Bailey, Supervisor of Business Education
Department of Adult and Vocational Education
Norfolk Public Schools
800 East City Hall Avenue
Norfolk, VA 23510

Program Site: New Bern-Craven County Schools, New Bern, NC

Key Features: Multilevel--three middle schools, one ninth-grade school, three high schools; interdisciplinary teams; staff development; development of middle-grades curriculum guide.

Description: **Initiation.** In the spring of 1987, one of the successful applicants for pilot site implementation of the BASICS program was the New Bern-Craven County Schools, New Bern, North Carolina. Although most of the pilot sites were implementing the program at the secondary level, the coordinator at New Bern, the vocational education director, was interested in involving the three middle schools, one ninth-grade school, and high schools across the district in a multilevel project. Over the previous summer and fall, discussions had taken place among instructional and administrative staff concerning the need to integrate vocational and academic education more closely.

The district also successfully sought funding through JTPA and established a Basic Improvement Program to provide support for students with problems related to academic and vocational studies or attendance.

This broad-based recognition of the need gave support for the administrative decision that teachers from both vocational and academic programs would be involved in the innovation from the beginning. Further, consolidated administrative support came, not only from the vocational director, but also from the superintendent and associate superintendent of instruction in the central office. They asked principals to identify the teachers in each school that would make this kind of program work.

Early staff development was important to the positive beginning. A decision was made to pay for substitute teachers so that the teachers could be involved with one of the BASICS developers from CETE. Together, they explored the possibilities for the school district and identified the high priority concerns that could be addressed by an integration program. The list included cohesion of academic and vocational education; instructional relevance; credit flexibility; need to teach problem solving, responsibility, and initiative; demonstration of coordinated and caring support, dropout prevention, and the development and monitoring of 4-year education plans.

At a later session, while the teachers and counselors worked on action plans, the associate superintendent brought the school principals together to discuss the program with a representative from Pennsylvania's Dauphin County Area Vocational-Technical School, which has a successful integration system based on clustering.

Initial implementation. The school district already had a strong career (prevocational) exploration program, encouraged in the state of North Carolina, to which 20 full-time teachers were assigned across the three middle schools. The New Bern-Craven County strategy developed for incorporating BASICS at the middle schools (grades 7 and 8) was to divide the teachers in each school into interdisciplinary teams for planning

purposes. A typical team has a career exploration teacher, a math/science teacher, a language arts/social studies teacher, an exceptional children's teacher and, wherever possible, a cultural arts teacher and a physical education teacher. Each team has a team leader. The team leaders form a core group to work with the Bridger (coordinator) for their school.

Middle-school students are assigned to a team of teachers, and students rotate every 9-12 weeks into one of three exploration labs. The teaching team coordinates subject matter instruction with the lab activities by meeting frequently during their common planning period.

During this phase, integrated instruction was identified as the staff development priority from the associate superintendent level. This allowed for curriculum development of the ***Integrated Middle Grades Curriculum Guide*** of competencies across disciplines, with strategies and activities developed by the teachers.

Full implementation. An initial reticence of teachers unused to the new relationships yielded to mutual respect through creative sharing activities that have become ongoing. First, one staff development day was spent with the academic teachers rotating through the career exploration labs as though they were students, gaining an appreciation of the importance of the labs. The return visits of the career exploration teachers to the academic classes were equally helpful.

Another activity that is popular enough to be subscribed on a purely voluntary basis is summer visits to local business and industry sites by groups that include both vocational and academic teachers. The program is coordinated by an advisory council and provides an option for continuing education credit. At the end of the visit, the interdisciplinary group meets to document what they have seen, which gives them a solid opportunity for communication about integration.

Institutionalization. The middle schools' project staff are surveyed at the end of every 12 weeks to gather information about what they are doing and what they feel they need in order to refine the program progressively. Lead teachers continue to meet three times per year to update the cross-referencing of curricula for the guide.

Contact Person:

L. Douglas Davis, Director of Vocational Education or
William Rivenbark, Associate Superintendent for Instruction
New Bern-Craven County Board of Education
3600 Trent Road
New Bern, NC 28562

State-Level Programs

Program Site: Program OPTIONS (Applied Academics), Division of Vocational and Career Education, Ohio Department of Education

Key Features: Coordinated planning, materials development, and teaching of applied academics with vocational programs.

Description: Background. In an effort to fulfill the goals and recommendations made in several key planning documents (e.g., ***Keeping Vocational Education at Work*** and ***Master Plan for Excellence***), as well as those made in a number of "reform" reports released in the early 1980s (e.g., ***A Nation at Risk*** and ***The Unfinished Agenda***), during the 1985-86 school year the Ohio Division of Vocational and Career Education initiated its Applied Academics Program. Under that program, which is administered via a support mode rather than by mandate, vocational educators who are interested in strengthening the academic components of their programs are offered a variety of strategies from which to select. These strategies or "OPTIONS" are adapted from the types of daily vocational class schedules that have been used traditionally in Ohio.

Requirements. Program OPTIONS includes the following key tenets and requirements:

- Teachers of applied academics course must be certified in their respective academic areas. (A vocational teacher may teach an applied academics course in his/her vocational program if he/she is also certified in that academic area.)
- State staff have undertaken specific steps to ensure ever-widening awareness and support for the OPTIONS Program through presentations to local superintendents and directors.
- State staff routinely provide inservice training to state and local administrative and instructional staff to acquaint them with applied academics and, specifically, with Program OPTIONS.
- Applied academics teachers develop courses of study that reflect the specific academic requirements that are found in related vocational course syllabi (i.e., job duties and tasks) and are approved by the Divisions of Elementary and Secondary Education and Vocational and Career Education. In lieu of developing new courses of study, teachers may adopt the Principles of Technology, Applied Mathematics, Technical Communications, or similar applied (and approved) curricula.
- Under Program OPTIONS, the courses focus on strengthening the academic components of vocational programs by teaching applied academics that relate directly to the specific contexts defined by the duties and tasks addressed in those programs rather than as more traditional, generalized (and typically abstract) academics.

Impact. Since its inception in school year 1985-86 through school year 1988-89, Program OPTIONS has affected--

- 50 out of 101 Vocational Education Planning Districts
- 440 out of 627 local education agencies (LEAs) or school districts
- 28,608 secondary vocational students across the state

During the 1989-90 school year, an additional 13,614 students participated in applied academics courses offered via Program OPTIONS.

During 1989-90, the Center on Education and Training for Employment conducted a comprehensive statewide evaluation of the Applied Academics Program for the Ohio Department of Education. The findings show that the program is having a significant positive impact on the math achievement of vocational students who participate and more limited impact on their science and reading achievement. OPTIONS graduates report earning about $.75 per hour more than non-OPTIONS graduates, and employers of OPTIONS graduates are more positive about those students' occupational competence and ability to adapt to changes in the workplace. The results affirmed the need for the Applied Academics Program and pointed to several specific recommendations for improving it as part of Ohio's modernization initiative.

Expansion. The continuing need for enhancing vocational students' basic academic skills was highlighted recently by passage of Ohio Senate Bill 140, which calls for modernization of the vocational curriculum in order to furnish students with the skills (academic, occupational, and employability skills) required to participate successfully in the workplace of the future. In keeping with the legislative mandate, the State Board of Education has proposed as the first objective in its action plan that applied academics and technology be implemented in all secondary educational programs and be recommended for full-time adult programs as well. In addition, that plan calls for developing different facilitative strategies (e.g., strengthening academic-vocational collaboration, addressing lifelong learning concepts and needs, encouraging student access to high quality academic and vocational programs), which could lead directly to the enhancement of students' academic skills.

Contact Person:

Vickie Melvin, Associate Director
Division of Vocational and Career Education
Ohio Department of Education
65 South Front Street, Room 907
Columbus, OH 43215

Program Site: Vocational Division, Arizona Department of Education

Key Features: Audit-analysis approach, granting of equivalent credit.

Description: Beginning in 1986, the Arizona Department of Education initiated a study (through Lester M. Snyder, Arizona State University) of how credit should be given for basic academic skills mastered in alternative programs and delivery systems. This study was partly in response to increased graduation requirements, mostly in academic subjects, reducing the time students can devote to vocational education courses. It was felt that, if the academic skills taught in an academic course and in a vocational program are sufficiently similar, equivalent credit could be given, thereby enhancing flexibility and diversity in student curriculum.

Audit-analysis approach. A detailed Basic/Essential Skills Taxonomy was compiled from skills lists of 18 states for language arts, mathematics, science, and free enterprise. Academic and vocational source materials were identified, coded, and then compared for equivalency to the Arizona Essential Skills Lists in each of the subject areas and to 14 vocational programs or Program Delivery Units (PDUs).

State board procedure. In 1988, the State Board of Education approved a procedure for granting equivalent credit toward graduation when the Essential Skills taught within a vocational program are equal to or greater in number than those taught in a given academic course. Under this procedure, 31 course comparisons have resulted in the following 16 equivalent credit recommendations:

- In free enterprise, the Marketing PDU
- In language arts, the Administrative Support and Marketing PDUs
- In science, the Horticulture, Nursing Assistant and Practical Nurse PDUs
- In mathematics, PDUs in Administrative Support, Agriculture Business Management, Building Repair, Building Trades, Clothing/Apparel, Food Services, Graphic Arts, Horticulture, Machinist, and Marketing

Expansion. The Vocational-Technical Education Consortium of States (V-TECS) is currently working to identify related academic skills in industry-validated tasks in various occupations and then relate them to the Arizona Basic/Essential Skills Taxonomy.

The Arizona Department of Education is sponsoring a project to correlate academic test items in mathematics, language arts, and science to the Taxonomy. This material will be shared with the V-TECS consortium. In Arizona, these test item banks will be used in assessing student learning and competency gains in basic and advanced academic skills.

Contact Person:

Dr. Charles Losh, Deputy Associate Superintendent
Vocational Program Improvement
Arizona Department of Education
1535 West Jefferson Street
Phoenix, AZ 85007

Regional Level Program

Program Site: SREB-State Vocational Education Consortium, Southern Regional Education Board

Key Features: Coordination of goals, objectives, and program assessment; state-supported pilot site experimentation; sharing of findings and professional development.

Description: The SREB Voc Ed Consortium effort encompasses 15 southeastern states* whose representatives have worked together since 1987 under a shared commitment to improve the basic competencies of vocational completers. The list of strategies adopted to bring about their improvement is far-reaching, from the implementation of applied academic curricula to involvement of the entire secondary school curriculum and staff in pursuit of a coherent program of studies under an individualized education plan that stresses high expectations. One of the premises, supported by preliminary test results, is that low-level academic courses, often labeled general, account for little gain in competency achievements of students; therefore, attention must be paid to the students' total educational experience rather than simply the vocational program. Within commonly required guidelines, one or more pilot sites per state (a total of over three dozen) are working under their own selected approaches to learn and share information about which integration strategies are most successful over a 6-year period.

Objectives. One of the major SREB Consortium achievements has been the setting of uniform guidelines and standards in spite of, but respecting, the differences among the member states. The following strategies comprise the objectives:

1. Establishing higher basic competency expectations for vocational completers.

2. Increasing the percentage of vocational completers who take higher-level communications, mathematics, and science courses.

3. Increasing the amount of emphasis and instructional time in vocational courses devoted to teaching and reinforcing basic competencies that underlie the occupational field of study.

4. Increasing the amount of emphasis and instructional time devoted to applied learning activities in basic competency courses.

5. Developing teams of communications, mathematics, science, vocational, and nonvocational teachers who work together to encourage and provide a broad range of instructional support services to students enrolled in vocational courses.

6. Establishing requirements for vocational completers that include a set number of units in a vocational field of study, keyboarding

* Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Virginia, West Virginia, and since 1988, Louisiana.

and computer literacy competencies, related vocational courses, and specific basic competency courses related to an occupational field of study.

7. Providing remedial studies, Individualized Academic Education Plans, and coordinated vocational and nonvocational instruction in mathematics and communications to low-achieving students enrolled in vocational courses.

8. Providing staff development for vocational teachers on basic competencies and instructional methods for teaching and reinforcing basic competencies.

9. Providing mathematics, science, and English teachers with staff development on applied instructional methods.

10. Providing school staff development on improving the learning climate for vocational completers.

11. Awarding up to two total basic competency credits in mathematics, science, and communications for equal content, time, or competencies through completion of a vocational concentration.

12. Aligning curriculum and instruction with the basic competencies vocational completers are expected to achieve.

Enhancement. Professional development has been critical. Each of the last four summers, a major Consortium conference has provided assistance for integration and sharing opportunities. Last year, an outcome of the conference was the development of 20 different 4-year programs of vocational and academic study by teams of academic and vocational educators. These programs of study were designed to be coherent and sequential programs to prepare students for both employment and postsecondary education. The Consortium is also assessing the project both qualitatively and quantitatively. An additional feature of the Consortium effort is that six pilot sites are, through federal funding, adding individualized support services to the integrated vocational-academic program to test the effectiveness in holding at-risk students in high school through graduation.

Selected activities. The following are representative activities recently reported by state members to the SREB Consortium Board.

Florida has been helping pilot sites develop cross-curriculum teams. Information from a personnel survey has helped teachers recognize that little communication had existed between academic and vocational teachers. Guest speakers from industry have shared with teachers the importance of working together. Thirty teachers in one site volunteered to work together and to meet every 2 weeks to develop cross-curriculum lesson plans. Seven teams of teachers had their schedule rearranged so they would have a common planning period. Joint academic and vocational teacher teams worked together this summer in industry and will use these and other experiences

to prepare curriculum materials for reinforcing academic content in vocational classes and applied learning in academic classes.

Georgia's approach to integrating academic content into vocational courses focuses on providing vocational teachers with instructional materials. Georgia has instructional materials that customize the reinforcing of academic competencies to a given vocational field. Vocational Applied Mathematics Resource Manuals are available for 23 different vocational fields. Individualized Language Arts Resource Manuals are available in 10 vocational fields. About one-third of the vocational classrooms in Georgia use these materials. They are used extensively by the two pilot sites.

Oklahoma has emphasized staff development and support to implement the applied academic courses successfully, asking teachers who have successfully implemented applied courses to teach other teachers. Oklahoma state staff arrange for first-year teachers to join a support network for the purpose of sharing successful strategies in teaching academics through an applied process.

In a number of the sites/states, staff are working to implement a 4-year planning process with students, enroll vocational students in higher-level academic courses (in some cases, replacing low-level courses with required applied courses), and replace the general track with a double purpose program of study designed to prepare students for both employment and further education.

Contact Person:

Dr. Gene Bottoms, Director
State Vocational Education Consortium
Southern Regional Education Board
592 Tenth Street, NW
Atlanta, GA 30318-5790

CURRICULAR RESOURCES

Principles of Technology (PT), a joint development of the Center for Occupational Research and Development (CORD) and the Agency for Instructional Technology (AIT), is an applied science (physics) course emphasizing mechanical, fluid, electrical, and thermal systems through a secondary-level instructional package including videos, print materials, and laboratories. The estimated student enrollment is 36,000 at over 1,600 sites. PT has been evaluated by the American Association for the Advancement of Science (AAAS). Their report, published in *Science Books and Films*, rated the materials "good" to "excellent" for accuracy, currency, organization, coherence, comprehensibility for certain groups of students, and for its treatment of science, technology, and society interrelationships. Over half of the consortium's 48 states and Canadian provinces allow science credit for the materials when they are taught as a course by a certified science teacher. An increasing number of 4-year postsecondary schools now accept PT for lab science credit toward entrance requirements. The PT materials are now in the process of revision.

The five instructional units of **Applied Mathematics** developed by CORD are now in their second year of full implementation at over 100 secondary-level sites in each of the consortium's 43 states. The estimated student enrollment is over 30,000. The program includes video, print, hands-on laboratories, and practical, world-of-work activities in arithmetic, algebra, geometry, trigonometry, probability, estimation, and problem solving. CORD is now in the process of developing additional units in **Applied Mathematics II**, in algebra, geometry, computer applications, and quality assurance/quality control, providing a full 2-year sequence.

Applied Communication, funded and developed by a consortium of 48 state and provincial education agencies in association with AIT, is a comprehensive curriculum designed to help 11th- and 12th-grade students develop and refine communication skills for the workplace. The curriculum (15 instructional modules) consists of print and video lessons that integrate reading, writing, listening, speaking, and problem solving in a workplace context.

The modules can be used together as a year-long course or alone in any order to broaden existing communication/language arts/English or vocational/technical courses. It can be integrated into other courses or offered as an alternative to traditional English courses.

The results of a year-long pilot test of the material conducted by the National Center for Research in Vocational Education indicated positive effects in attitudes toward English/Language Arts, achievement in problem solving linked to communication, and understanding of how

English/Language Arts applies to the workplace.

Development of the first-year materials in **Applied Biology/Chemistry (ABC)** is underway by CORD. In preparation for the field test of the ABC materials, a training workshop attended by over 100 teachers has been held. **Natural Resources**, the first instructional unit, has been revised to incorporate the findings of its pilot test in the fall of 1989 and is now being field tested at an estimated 100 sites. The remaining six units in the first-year materials are in various stages of development.

Another curriculum under development is **Workplace Readiness**, focusing on skills relating to personal behavior and group effectiveness. AIT is working on this curriculum through a consortium arrangement.

For further information, contact Maurice Dutton or Piers Bateman at CORD, telephone: (800) 231-3015; in Texas or outside the U.S., (817) 772-8756; contact Bennie Lucroy at AIT, telephone: (800) 457-4509; in Indiana or outside the U.S., call (812) 339-2203.

REFERENCES

Items with ED numbers may be ordered from the ERIC Document Reproduction Service, 3900 Wheeler Avenue, Alexandria, VA 22304-6409, (800) 277-3742, (703) 823-0500.

Adelman, Nancy E. ***The Case for Integrating Academic and Vocational Education***. Background Paper for the National Assessment of Vocational Education. Washington, DC: Policy Studies Associates, 1989. (ERIC Document Reproduction Service No. ED 315 513).

Agency for Instructional Technology. ***Applied Communication***. Bloomington, IN: AIT, 1988.

Agency for Instructional Technology and Center for Occupational Research and Development. ***Principles of Technology***. Waco, TX: AIT and CORD, 1987.

Bottoms, James E. ***Closing the Gap between Vocational and Academic Education***. Background Paper for the National Assessment of Vocational Education. Washington, DC: Policy Studies Associates, 1989. (ERIC Document Reproduction Service No. ED 315 516).

Center for Occupational Research and Development. ***Applied Mathematics***. Waco, TX: a CORD, 1988.

Crowe, Michael R.; Pritz, Sandra G.; Sechler, Judith A.; and Veach, June P. ***BASICS: Bridging Vocational and Academic Skills***. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1987. Materials include:

-- Crowe, Michael R., and Pritz, Sandra G. ***Introducing BASICS*** (videotape).

-- Crowe, Michael R.; Pritz, Sandra G.; and Veach, June P. ***Implementation Guide for BASICS: Bridging Vocational and Academic Skills***. (ERIC Document Reproduction Service No. ED 288 955).

-- Pritz, Sandra G., and Crowe, Michael R. ***Instructional Materials Development***. (ERIC Document Reproduction Service No. ED 288 958).

-- Pritz, Sandra G., and Crowe, Michael R. ***Technique for Individualization: The Academic Development Plan***. (ERIC Document Reproduction Service No. ED 288 964).

-- Veach, June P.; Pritz, Sandra G.; and Crowe, Michael R. ***Supplemental Instructional Resources***. (ERIC Document Reproduction Service No. ED 288 959).

-- Adapted by Pritz, Sandra G., and Crowe, Michael R. ***Technique for Computer Use: Software Evaluation***. (ERIC Document Reproduction Service No. ED 288 963).

-- Adapted by Pritz, Sandra G., and Crowe, Michael R. ***Techniques for Joint Effort: The Vocational-Academic Approach***. (ERIC Document Reproduction Service No. ED 288 960).

-- Adapted by Pritz, Sandra G., and Crowe, Michael R. ***Techniques for Remediation: Peer Tutoring***. (ERIC Document Reproduction Service No. ED 288 962).

Grubb, W. Norton; Plihal, Jane; Davis, Gary; Lum, Jeannie; and Morgaine, Carol. ***"The Cunning Hand, The Cultured Mind": Models for Integrating Vocational and Academic Education***. Berkeley: National Center for Research in Vocational Education, University of California, forthcoming.

Losh, Charles; Border, Barbara; and Bishop, Diane. ***Integrating Vocational-Technical Education and Basic Academic Skills: A Status Report***. Phoenix: Arizona Department of Education, 1988. (ERIC Document Reproduction Service No. ED 298 269).

Peterson, John M. "Remediation Is No Remedy." ***Educational Leadership*** 46, no. 6 (March 1989): 24-25. (ERIC No. EJ 385 274).

Pratzner, Frank C. "The Practical Application and Meaningful Integration of Skills." ***Journal of Industrial Teacher Education*** 25, no. 2 (Winter 1988): 81-83.

Weber, J. M.; Puleo, N.; Fisch, M.; Kurth, P.; and Schaffner, D. ***The Dynamics of Secondary Vocational Classrooms***. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1988. (ERIC Document Reproduction Service No. ED 297 090).

THE 1989 ERIC INFORMATION ANALYSIS PAPERS

IN 336 $5.25

Learning and Reality: Reflections on Trends in Adult Learning, by Robert A. Fellenz and Gary J. Conti.

The focus of the adult education field is shifting to adult learning. Among the trends Fellenz and Conti identify are changing conceptions of intelligence; assessment of learning style; types of learning strategies; learning in the social environment; and participatory research. They conclude that the current trends in adult learning research point to a new image of the adult learner as an empowered learner.

IN 337 $7.00

Adults with Learning Disabilities: An Overview for the Adult Educator, by Jovita M. Ross-Gordon.

Learning disabilities (LD) among adults are more prevalent than was once thought. Ross-Gordon stresses that assessment of these adults should recognize their strengths and needs as adults, and she provides guidelines for the selection of appropriate diagnostic instruments. Recommendations for policy and research emphasize a comprehensive, holistic approach that abandons the "deficit" perspective and considers the adult with LD as a critical contributor to the resolution of the problem.

IN 338 $8.75

Adult Literacy Education: Program Evaluation and Learner Assessment, by Susan L. Lytle and Marcie Wolfe.

Lytle and Wolfe provide information to shape the design of adult literacy evaluation, beginning with considerations of adults as learners, concepts of literacy, and educational contexts. They identify resources for planning program evaluations and four types of approaches: standardized testing, materials-based assessment, competency-based assessment, and participatory assessment. Lytle and Wolfe present 10 critical features of a framework for program evaluation and learner assessment in adult literacy education.

IN 339 $8.75

School-to-Work Transition for At-Risk Youth, by Sheila H. Feichtner.

School-to-work transition helps at-risk youth develop the skills and attitudes needed to secure and maintain employment and an adult life-style. The transition process must include a wide range of articulated services and systematic procedures for prescribing appropriate individual assistance and for tracking information. Feichtner identifies a number of program and service barriers that compound the societal barriers faced by at-risk youth and addresses major policy concerns and research needs.

IN 340 $5.25

The Role of Vocational Education in the Development of Students' Academic Skills, by Sandra G. Pritz.

One response to recent educational reform movements has been the integration of academic skills and vocational skills. This paper includes a position statement of the National Association of State Directors of Vocational Education on vocational education's role in the acquisition of basic skills. Also included are guidelines for implementing the policies and principles of skills integration in vocational education programs.

ORDERING INSTRUCTIONS

To order additional copies, please use order number and title. Orders of $10.00 or less should be prepaid. Make remittance payable to the Center on Education and Training for Employment. Mail order to:

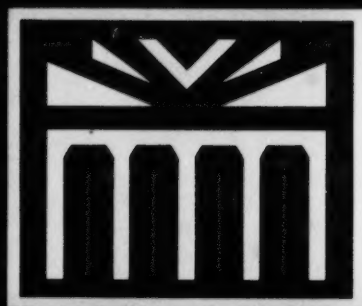
Center on Education and Training for Employment
Center Publications
1900 Kenny Road
Columbus, OH 43210-1090

Prices listed are in effect at the time of publication of this book. All prices include postage and handling. Prices are subject to change without notice.

Quantity Discounts
Orders of five (5) or more items, as listed by publication number and title, with a total dollar value for the order of:

$ 50 to $100, the discount is 5%
$101 to $200, the discount is 10%
$201 to $300, the discount is 15%
$301 to $400, the discount is 20%
$401 and above, the discount is 25%

International Orders
All orders, in any amount, from outside the United States and its possessions are to be paid in U.S. currency. Additional postage and handling charges may be added for foreign shipments if necessary.



STATE DIRECTORS

VOCATIONAL TECHNICAL EDUCATION

VOCATIONAL TECHNICAL EDUCATION:

DEVELOPING ACADEMIC SKILLS

A Position Statement of the
National Association of State Directors of
Vocational Technical Education Consortium

OFFICERS

PRESIDENT
Dr. Clifton B. Belcher
Director, Division of Vocational Education Services
North Carolina Department of Public Instruction

VICE PRESIDENT
Dr. Darrell Parks
Director of Vocational and Career Education
Ohio Department of Education

SECRETARY/TREASURER
Dr. Roy V. Peters, Jr.
State Director
Oklahoma Department
Vocational Technical Education

PAST PRESIDENT
James A. Kadamus
Assistant Commissioner
Occupational and Continuing Education
New York Department of Education

BOARD OF DIRECTORS

Dr. David F. Cronin
Massachusetts

Dr. Lloyd Newbaker
New Jersey

Adam Sponaugle
West Virginia

William Johnson
Georgia

Dr. Lola Jackson
Michigan

Dr. Raymond E. Morrison
Arkansas

Dr. Marge Harouff
Nebraska

Larry Zikmund
South Dakota

Barbara Border
Arizona

Karen Ryals
Alaska

John Cruz
Guam

William Riley
Pennsylvania

EXECUTIVE DIRECTOR

Madeleine B. Hemmings

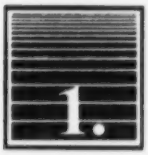
NASDVTEC

Founded in 1920, the National Association of State Directors of Vocational Technical Education Consortium is the Washington based organization of some 50 state vocational education agency heads committed to leadership and outstanding performance in vocational technical education. The Association has a growing membership of over 200 senior state staff and concerned business, labor and other education officials who share the directors' commitment to quality occupational education at the secondary and post-secondary and adult levels.

VOCATIONAL TECHNICAL EDUCATION:

DEVELOPING ACADEMIC SKILLS

A Position Statement of the National Association of State Directors of Vocational Technical Education Consortium



A PRISM OF OPPORTUNITY

As the 21st century looms on the horizon, educational reform presents many opportunities to better prepare the minds of our nation's youth. A myriad of challenges face both academic and vocational-technical education (VTE). Rapid technological change in a highly competitive world economy demands a skilled work force that posseses the basic academic skills necessary for lifelong learning. Academic and vocational-technical education cannot remain exclusive entities competing for limited resources amid finite school boundaries. Rather, all students must be afforded the opportunity to graduate from high school with marketable occupational skills as well as those needed for postsecondary education. An integrated partnership supporting students' varied learning styles is the most effective means of achieving the academic and vocational-technical competence needed in a global economy.

The Demographic Facet

A growing economy depends on a growing supply of labor that is suitably skilled for the modern workplace. The decline in the United States birthrate since 1960 has sharply reduced the number of workforce entrants. Moreover, increased percentages of females, minorities, and immigrants will be entering the job market-the very groups who have benefited least from the traditional educational system in terms of basic skills acquisition.

According to the Hudson Institute,[1] many future work-force entrants will be qualified only for a limited number of low-skill jobs, while relatively few will be qualified for the large number of high-skill jobs. This skill gap is likely to exacerbate minority youth unemployment and to accelerate the growth of a permanent underclass caught in a vicious cycle of poverty. However, jobs will be waiting for those who possess the skills required for work-place productivity.

The Technological Facet

Employers in business and industry have traditionally acted as advisors concerning the content of vocational-technical programs. Their advice and demands have substantially shifted over the last decade due to declining U.S. productivity and accelerated international competition. In economic terms, this shift is due to a loss of our country's competitive advantage in low-skill, labor-intensive jobs and a need to concentrate instead on high-technology skill applications.

As technology continues to change, workers must adapt to a changing workplace. Employers still need vocational-technical workers with specific occupational skills — especially in the service, manufacturing, and information-processing areas. Yet those workers must have a solid grounding in basic academic skills to maintain employment in an everchanging global economy.[2]

As vocational-technical education programs strive to upgrade students' basic academic skills, it is important to be clear about the nature of employers' demands. Employers have little use for well learned academic skills that cannot be transferred or applied to making decisions and solving problems on the job.

Therefore, it is critical for students to gain instruction and practice in using abstract concepts to efficiently manage practical situations and work cooperatively in groups. Fragmentation of learning can be combated by a deliberate effort to integrate all learning experiences. Applied learning of basic academic skills is the key to such integration.

The Curricular Facet

Recognition is growing that the application-oriented setting of vocational programs can provide an avenue to basic academic skills acquisition, enhancement, and transference. As more is learned about the importance of learning styles in the acquisition of academic skills, there are implications for the ways in which schools tend to be structured in favor of students with strong auditory and visual skills. If it is confirmed, as has been asserted, that learning styles of low-achieving students tend to be weak in the auditory and visual areas but high in the kinesthetic and tactile areas,[3] then the hands-on participatory nature of instruction found in vocational classrooms will serve them well.

U.S. Secretary of Labor Elizabeth Dole has noted, "Many young people suffer not only from a skills gap-but from a motivation gap as well."[4] We contend that there is an important link between a skills gap and a motivation gap, namely that both result from the perceived lack of relevance of the skills to young people's lives. Some suggestions for remending this situation are to

- Make school more like a simulated workplace
- Integrate learning between school and work
- Institute internships and apprenticeships

All these techniques characterize existing vocational programs, and can be expanded and improved upon. This is a specific area in which VTE programs can serve college preparatory students who may know abstract concepts well and yet be unable to use them in job situations.

Academic skills learned via an applications mode in a vocational-technical setting often becomes more meaningful to students. If the purpose for learning a specific skill is made obvious, students are likely to be more motivated to learn. The need for diversity in instructional approaches throughout schooling points to a significant role for VTE.

The At-Risk Facet

Students who have repeatedly failed to respond to an abstract-concept approach to learning often suffer from feelings of failure and low self-esteem. Poor basic skills acquisition by students at risk of dropping out of school is highly correlated with poor general academic performance and repetition of grade levels. In turn, these factors affect and may worsen an already low self-concept; disinterest in, and alienation from, school; hostility and unruliness, or passivity and apathy; frequent absences, and tardiness.[5]

An interesting comparison was found between the characteristics of exemplary drop-out-prevention programs and the characteristics of vocational-technical classrooms observed in an extensive national observation study.[6]

There appears to be a correlation regarding the strength of relationships that both types of programs are able to build between the occupational skills and academic skills elements. Part of this is undoubtedly grounded in the use of a concrete applications approach to stimulate learning success.

---

[1] *William B. Johnson, Workforce 2000: Work and Workers for the 21st Century. Indianapolis: The Hudson Institute, 1987.*

[2] *Academic Preparation for the World of Work. The College Board, 1984, and Workplace Basics: The Skills Employers Want. American Society for Training and Development, 1989.*

[3] *Helen Hodges, "Opening Doors for Students 'At Risk,'" ASCD Update, Vol. 30, No. 2 (March 1988), pp. 1-2.*

[4] *Elizabeth Dole in address to the National Association of State Councils on Vocational Education; June 14, 1989.*

[5] *Todd F. Finnimore and Sandra G. Pritz. A Guide for Dropout Prevention: Creating an Integrated Learning Environment in Secondary Schools. (Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1988).*

[6] *James M. Weber, "The Relevance of Vocational Education to Dropout Prevention," Vocational Education Journal, Vol. 63, No. 6 (September 1988), pp. 36-38.*

AN INTEGRATED VISION

The most comprehensive programs of vocational and academic alignment expand the concept of integration beyond curricular concerns in a restructured relationship between academic and vocational education. Movement toward this kind of structural change could, if its promise is borne out over time, result in basic education reforms even more pervasive than those of the last decade.

Research shows that curriculum development and professional development are the key activities associated with implementing an integrated curriculum. It is preferable to have both academic and vocational instructors involved in the innovation from the start.[7]

The various ways in which vocational educators are changing practices and curricula in response to the call for more and better basic skills signals attention to the intensity of work, discussion, and change that has occurred over the last five years. Vocational education leaders at all levels a proactive stance and actively pursued the challenge to develop academic skills, but concurrently seek the support and cooperation of others in the educational community and the community at large.

One method of sharing responsibility between academic and vocational educators is to correlate vocational and academic curricula. In this effort, vocational and academic educators identify where academic concepts are used in vocational courses. A matrix of occupational tasks and academic concepts is then developed and coded at intersection points where a particular academic concept is needed to perform a particular occupational task. Further aspects can be incorporated into the matrx, such as time spent in instruction and practice or the level of learning required. Cross-correlations are being piloted and fostered by a number of states.

The Southern Regional Education Board (SREB) Consortium of States on Basic and Vocational Skills was created to work cooperatively on restructuring strategies to improve vocational students' basic-skills competencies. The SREB Consortium developed structural alternatives that help integrate academic education and occupational education. Fourteen participating states are piloting and evaluating those alternatives. By 1993, data will be available to support the replication of the most successful strategies nationwide.

The Center for Occupational Research and Development (CORD) and the Agency for

Instructional Technology (AIT) have, through the consortium approach, developed teaching materials in applied physics, biology/chemistry, mathematics, communication, and employability skills while developing partnerships that crossed state lines. Each state vocational-technical education agency acknowledged a specific need for particular materials, and committed both money and intellect to meet the needs. Today, these materials are being used in 47 states and several thousand schools.

The Vocational Technical Consortium of States (V-TECS) is presently identifying the related academic skills that a worker needs to know in order to perform tasks in various occupations. This is being done as part of the task analysis process used to identify instructional content from an industry-validated base of occupational content. These basic academic skills are then being coded to the V-TECS' version of the Snyder Taxonomy of Basic/Essential Skills.

Vocational and academic educators need to work together to see that students acquire basic academic skills in relation to occupational training, and receive credit for them. It is also important for students to develop these skills in an environment that provides for diversity in student learning styles. Following are two objectives needed to meet these goals:

- Teachers and administrators must be given preservice and inservice staff development opportunities covering learning styles and classroom teaching strategies to meet learners' diverse needs.
- Joint staff-development programs must be created for academic and vocational teachers to help them understand each other's curriculum goals and ways in which they can work together to advance their students' basic competencies.

Teacher-education institutions and state and local education agencies must work together to help current teachers upgrade their academic knowledge and ability to use teaching methods that integrate academic and vocational studies. Teacher education must

- Design instructional strategies for vocational courses that encourage vocational students to use mathematics, writing, reading, and thinking skills to advance their academic knowledge and use of technical materials and to further develop their desire for lifelong learning.
- Assure the academic competencies of vocational teachers entering the profession from the work world who may not have a college degree, and prepare them to teach those competencies as they relate to occupational skills
- Develop programs to show vocational teachers how academic concepts are

used in the workplace and how to use real-world problems in all their courses

State certification guidelines should require vocational education teachers to master

- Both the technical competencies in their vocational discipline and the academic competencies that underlie their specialty
- Teaching methods that enable them to connect the teaching of needed academic competencies with related technical knowledge and skills
- Courses in mathematics, communication, and science that underlie their vocational teaching field

As the education community coalesces to reshape their approach to educating students, great strides can be made. Advances will require patience, understanding, and constant communciaton between the education family, parents, students, employers, and the public. As responsible professionals and leaders, VTE cannot let this opportunity go by to reaffirm the public confidence that has built our education system into the national resource it is today.

---

[1]*Nancy E. Aldeman and James E. Bottoms. The Case for Integrating Academic and Vocational Education. National Assessment of Vocational Education, U.S. Department of Education, 1989.*

A UNITED FOCUS

We have stated our belief that VTE has an important and multifaceted role to play in helping students develop basic academic skills — an important component in their preparation for lifelong learning and employment. VTE leaders intend to continue to press toward an integrated education program that will greatly contribute to that goal. However, if the integration of vocational and academic education is to continue to progress along the paths established primarily through vocational education initiatives, much remains to be done.

Federal support is needed in the following areas:[8]

1. Federal legislation that encourages integrative programs, and that gives states incentives to do the same, should reinforce program diversity and allow for relatively long funding cycles.
2. Federal funding of research and development regarding the terms and conditions under which integration programs produce learning gains should be designed to measure the effects of learning in an applied context that supports stronger evaluation.
3. A commitment by the academic education community to work cooperatively on integration programs needs to be buttressed by incentives from the federal and state governments and from business and industry.
4. Increased coursework requirements by teacher-training institutions need to prepare teachers to teach basic skills to a diverse student population.
5. Recognition needs to be given by mainstream education leaders regarding VTE as a part of the solution to improving education in general. Vocational and academic education are complements, not competitors.

State support is needed in the following areas:

1. States should direct federal and state funds to those vocational programs designed to give students rigorous, coordinated programs of vocational and academic studies in grades 9-12. To do so, the federal and state education agencies will need to redefine a vocational program to include vocational courses, related vocational courses, and the language arts, mathematics, and science courses necessary for students to maximize their potential in an occupational field.

2. State boards of vocational education should develop long-range plans and establish comprehensive state policy structures to institutionalize integration.

3. States should require the teaching and guidance staff in junior high and middle schools to help each student develop, by the end of the eighth grade, a plan for a four-year program of academic and vocational studies to be pursued during high school. Students and their parents must be made aware of the full range of options open to them, and of the availability of — and the pay range for — the occupations that students are considering.

4. States should require local school systems to provide students access to high-level mathematics, science, and technical writing courses designed to teach academic content through an applied process.

5. States should use high school graduation requirements to raise the level of performance expected of secondary vocational completers and to give proper recognition to high school graduates who have completed the requirements for a combined program of academic and vocational studies.

Local support is needed in the following areas:

1. All students should be encouraged to enroll and succeed, in as many advanced academic programs as possible, and teachers should use applied-learning methods in all classes.

2. Communications, mathematics, and science programs for all students should draw on examples and use activities and problems faced in the world of work. Students would then see the relevance of their studies to the world of work and be prepared to use their background in the workplace when they arrive there.

3. High School students must be placed in coherent sequences of courses. Vocational students must be required to complete logical sequences of occupational preparation courses and the theoretical and academic courses necessary to succeedd and grow in the occupational cluster.

4. Experiences must be created for academic techers that will enable them to understand that vocational students can learn, so the teachers will expect them to learn. It has been shown that where schools and teachers established a climate of encouragement and higher expectations for vocational students, the students scored high on the NAEP reading, mathematics, and science tests.[8]

[8] *Ibid.*

A BETTER-PREPARED WORK FORCE

Preparation for work in a global economy must include preparation for continued learning in either a work or educational setting.[9] The primary aim of VTE is to meet people's work-related educational needs. Those educational needs encompass occupational skill development and the academic skills needed to enter and remain in the world of work.

Basic skills in mathematics, science, and communication (reading, writing, speaking, and listening) form the foundation for lifelong learning. They also provide the content for high-order thinking skills such as critical thinking, decision making, and problem solving. Occupational skills depend on, and do not exist apart from, academic foundations.

VTE can reinforce academic skills acquisition by

- Focusing on the application of basic academic skills as an integral part of the occupational education program
- Using the applied learning method in academic courses to show students the "real life" value of knowledge, thereby empowering them to transfer that knowledge across tasks

The proposals we support will help supply our nation with a better-prepared work force to face the challenges and opportunities ahead in the twenty-first century. VTE has been the leader in effort to initiate joint approaches to basic skills integration. To reinforce and expand thier effort, the National Association of State Directors of Vocational-Technical Education Consortium seeks wider and much closer working relationships with the academic education community on federal, state, and local levels. To further develop these relationships, major changes must be initiated in secondary education methods and management.

---

[9] *James E. Bottoms. Closing the Gap Between Vocational and Academic Education. National Assessment of Vocational Education, U.S. Department of Education, 1989.*

STATE DIRECTORS
OF VOCATIONAL TECHNICAL EDUCATION

ALABAMA
Dr. Stephen Franks
State Director
Vocational Technical Education

ALASKA
Ms. Karen Ryals
State Director
Adult & Vocational Education

AMERICAN SAMOA
Mr. Valaparaiso Ieremia
State Director
Vocational Education

ARIZONA
Ms. Barbara Border
State Director
Technical Education

ARKANSAS
Dr. Raymond E. Morrison
Director of Vocational
Technical and Adult Education

CALIFORNIA
Mr. James T. Allison
Assistant Superintendent
Vocational Technical Education

COLORADO
Dr. Clay Whitlow
Vice President
Educational Services
Colorado Community College &
Occupational Education System

CONNECTICUT
Dr. Theodore Sergi
Associate Commissioner/Director
Division of Vocational & Adult Education

DELAWARE
Dr. Thomas Welch
State Director
Vocational Technical Education

DISTRICT OF COLUMBIA
Ms. Cynthia M. Bell
State Director
Vocational Technical Education

FLORIDA
Mr. Robert Howell
State Director
Vocational Technical Education

GEORGIA
Mr. William P. Johnson
Associate State Superintendent

GUAM
Mr. John Cruz
President/State Director
Guam Community College

HAWAII
Dr. Lawrence A. Inaba
State Director
Vocational Education

IDAHO
Dr. Trudy Anderson
State Director
Idaho Division of Vocational Education

ILLINOIS
Dr. Richard Miguel
State Director
Vocational Technical Education

INDIANA
Dr. William Christopher
Commissioner
Indiana Commission on Vocational
Technical Education

IOWA
Ms. Phyllis A. Herriage
Director
Career Education

KANSAS
Mr. Tom Moore
State Director
Vocational Technical Education

KENTUCKY
Ms. Audrey T. Carr
State Superintendent
for Vocational Education

LOUISIANA
Mr. Raymond Bell
Assistant State Superintendent
for Vocational Education

MAINE
Mr. William H. Cassidy
Associate Commissioner
Bureau of Vocational Education

MARSHALL ISLANDS
Mr. Greg Sammer
State Director
Vocational Technical Education

MARYLAND
Ms. Katharine Oliver
Assistant State Superintendent
Vocational Technical Education

MASSACHUSETTS
Dr. David F. Cronin
Associate Commissioner
Division of Occupational Education

MICRONESIA
Catalino Cantero
Assistant Secretary
Department of Human Resources

MICHIGAN
Dr. Lola V. Jackson
State Director
Vocational Technical Education

MINNESOTA
Dr. Carol Johnson
Chancellor
Minnesota Technical College System

MISSISSIPPI
Mr. Elwyn Wheat
Associate State Superintendent
Vocational Technical Education

MISSOURI
Dr. Frank Drake
Assistant Commissioner & Director
Vocational Education

MONTANA
Ms. Brady J. Vardemann
Deputy Commissioner
Vocational Technical Education

NEBRASKA
Dr. Marge Harouff
Assistant Commissioner
Vocational Education

NEVADA
Mr. Bill Trabert
Director
Vocational Education

NEW HAMPSHIRE
Dr. G. William Porter
Director
Vocational Technical Education

NEW JERSEY
Dr. Lloyd Newbaker
Assistant Commissioner
Vocational Technical Education

NEW MEXICO
Mr. Albert Zamora
Director
Vocational Technical Education

NEW YORK
Mr. James A. Kadamus
Assistant Commissioner
Occupational & Continuing Education

NORTH CAROLINA
Dr. Clifton B. Belcher
Director
Division of Vocational Education Services

NORTH DAKOTA
Mr. Carroll E. Burchinal
Director/Executive Officer
State Board of Education

NORTHERN MARIANAS
Ms. Elizabeth Rechebei
Commissioner of Education

OHIO
Dr. Darrell L. Parks
Director
Vocational & Career Education

OKLAHOMA
Dr. Roy V. Peters, Jr.
State Director
Vocational Technical Education

OREGON
Mr. Monty Multanen
Assistant Superintendent
Division of Vocational Education

REPUBLIC OF PALAU
Martin Sokau
State Vocational Program Coordinator
Bureau of Education

PENNSYLVANIA
Dr. Furman Moody
Acting State Director
Vocational Education

PUERTO RICO
Mr. Rafael Gautier
Assistant Secretary
Vocational Technical Foundation

RHODE ISLAND
Dr. Frank Santoro
Deputy Assistant Commissioner
for Education

SOUTH CAROLINA
Mr. Moody Oswald
Director
Office of Vocational Education

SOUTH DAKOTA
Mr. Lary p. Zikmund
State Director of Vocational Technical Education

TENNESSEE
Mr. Marvin Flatt
Assistant Commissioner
Division of Vocational Education

TEXAS
Dr. J. R. Cummings
Deputy Commissioner of Special Projects

UTAH
Mr. Joe O. Luke
State Director
Vocational Education

VERMONT
Mr. Gerald A. Asselin
Director
Adult Vocational and Technical Education

VIRGIN ISLANDS
Dr. Ram D. Bansal
State Director
Vocational Education

VIRGINIA
Mr. Jerry Hicks
State Director
Vocational & Adult Education

WASHINGTON
Mr. Merritt D. Long
State Director
Vocational Technical Education

WEST VIRGINIA
Dr. Adam Sponaugle
Assistant State Superintendent
Bureau of Vocational Technical and Adult Education

WISCONSIN
Mr. Dwight York
State Director
Vocational Technical Education

WYOMING
Dr. Gayle R. Lain
State Director
Vocational Technical Education

National Association of State Directors of Vocational Technical Education Consortium
1420 16th Street, NW □ Washington, DC □ 20036 □ (202) 328-0216 □ Fax (202) 797-3756